Electronic Version
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Claims

[c1] 1. A cooling system for a battery in a vehicle having a passenger compartment, the cooling system comprising:
an air intake for receiving air from an ambient environment outside the vehicle;
a duct system capable of providing communication between the air intake and the battery, the duct system being configured to inhibit air flow between the duct system and the vehicle passenger compartment;
a fan cooperating with the duct system for moving air through at least a portion of the duct system and across the battery; and
a heat exchanger cooperating with the duct system and selectively operable to cool air flowing in the duct system before the flowing air reaches the battery.

[c2] 2. The cooling system of claim 1, further comprising an air outlet configured to facilitate air flow from the duct system to the ambient environment outside the vehicle.

[c3] 3. The cooling system of claim 2, wherein the air outlet includes first and second portions, the first portion being in communication with the duct system, and the second portion being in communication with the vehicle passen-

ger compartment, the second portion including a flow inhibitor for inhibiting air flow from the duct system to the vehicle passenger compartment.

[c4] 4. The cooling system of claim 2, wherein the duct system includes a first baffle movable between a first position for facilitating communication between the air intake and the battery, while inhibiting recirculation of air across the battery, and a second position for inhibiting communication between the air intake and the battery, while facilitating recirculation of air across the battery.

[c5] 5. The cooling system of claim 4, wherein the first baffle is movable to an intermediate position which facilitates communication between the air intake and the battery, and recirculation of air across the battery.

[c6] 6. The cooling system of claim 5, wherein the duct system further includes a second baffle movable between a first position for facilitating air flow from the duct system through the air outlet, and a second position for inhibiting air flow from the duct system through the air outlet.

[c7] 7. The cooling system of claim 5, wherein movement of the first and second baffles is synchronous.

[c8] 8. The cooling system of claim 5, further comprising:

a first sensor configured to measure a temperature indicative of the ambient environment outside the vehicle, and to output a signal related to the ambient temperature;

a second sensor disposed in relation to the battery for measuring a temperature indicative of battery temperature, the second sensor being configured to output a signal related to the battery temperature; and

a controller configured to receive the signals output from the first and second sensors, and to control the operation of the fan, the heat exchanger, and the first and second baffles, at least partly based on the signals received.

[c9] 9. A cooling system for a battery in a vehicle having a passenger compartment, the cooling system comprising:

an air intake for receiving ambient air from outside the vehicle;

a duct system including first and second duct subsystems, the first duct subsystem being disposed between the air intake and the battery for providing an air flow path from the air intake to the battery, the second duct subsystem being disposed between the battery and the first duct subsystem for providing an air flow path from the battery to the first duct subsystem, the duct system being configured to selectively inhibit air flow through at

least a portion of the first and second duct subsystems;
a fan cooperating with the duct system for moving air through at least a portion of the duct system and across the battery; and
a heat exchanger cooperating with the duct system and selectively operable to cool air flowing in the duct system before the flowing air reaches the battery.

[c10] 10. The cooling system of claim 9, wherein the duct system further includes a first baffle movable between first and second positions, the first position facilitating air flow from the air intake to the battery through the first duct subsystem, the second position facilitating air flow from the battery to the first duct subsystem through the second duct subsystem.

[c11] 11. The cooling system of claim 10, wherein the first baffle is movable to an intermediate position for facilitating air flow through the first and second duct subsystems.

[c12] 12. The cooling system of claim 11, further comprising an air outlet communicating with the ambient environment outside the vehicle, and wherein the duct system further includes a third duct subsystem cooperating with the air outlet to provide an air flow path to the ambient environment outside the vehicle.

[c13] 13. The cooling system of claim 12, wherein the air outlet includes first and second portions, the first portion being in communication with the duct system, and the second portion being in communication with the vehicle passenger compartment, the second portion including a flow inhibitor for inhibiting air flow from the duct system to the vehicle passenger compartment.

[c14] 14. The cooling system of claim 12, wherein the duct system includes a second baffle movable between a first for facilitating air flow through the third duct subsystem, and a second position for inhibiting air flow through the third duct subsystem.

[c15] 15. The cooling system of claim 14, wherein movement of the first and second baffles is synchronous.

[c16] 16. The cooling system of claim 14, further comprising:
a first sensor configured to measure a temperature indicative of the ambient environment outside the vehicle, and to output a signal related to the ambient temperature;
a second sensor disposed in relation to the battery for measuring a temperature indicative of battery temperature, the second sensor being configured to output a signal related to the battery temperature; and

a controller configured to receive the signals output from the first and second sensors, and to control the operation of the fan, the heat exchanger, and the first and second baffles, at least partly based on the signals received.

[c17] 17. A vehicle having a passenger compartment and a battery, the vehicle comprising:
a battery cooling system including an air intake for receiving air from an ambient environment outside the vehicle, a duct system configured to selectively provide communication between the air intake and the battery, and further configured to inhibit communication between the passenger compartment and the battery, the battery cooling system further including a fan cooperating with the duct system for moving air through at least a portion of the duct system and across the battery, and a heat exchanger cooperating with the duct system and selectively operable to cool air flowing in the duct system before the flowing air reaches the battery.

[c18] 18. The vehicle of claim 17 having a rear vehicle opening and a load floor having the battery disposed therebeneath, wherein the battery cooling system further includes first and second portions, the first portion being adjacent the rear door opening and configured to provide substantially uninhibited access to the passenger

compartment through the opening, the second portion being disposed beneath the load floor, adjacent the battery.

[c19] 19. The vehicle of claim 17, wherein the duct system includes a baffle movable between a first position for facilitating communication between the air intake and the battery, while inhibiting recirculation of air across the battery, and a second position for inhibiting communication between the air intake and the battery, while facilitating recirculation of air across the battery.

[c20] 20. The vehicle of claim 19, wherein the battery cooling system further includes first and second sensors in communication with a controller, the first sensor being configured to measure a temperature indicative of the ambient environment outside the vehicle and to output a signal related to the ambient temperature, the second sensor being disposed in relation to the battery for measuring a temperature indicative of battery temperature, the second sensor being configured to output a signal related to the battery temperature, the controller being configured to receive the signals output from the first and second sensors, and to control the operation of the fan, the heat exchanger, and the baffle, at least partly based on the signals received.